1. Executive Summary.

The provincial *Transportation of Dangerous Goods Control Act* is administered by the Dangerous Goods Control Division of Alberta Public Safety Services (APSS). The Act is consistent with the federal legislation and the requirements for the transportation of dangerous goods are uniform across Canada. A Canada - U.S. reciprocity agreement is in place for transborder shipments. The Act and regulations require shippers and transporters to conform to a number of safety requirements including safety marking, documentation, training and reporting of incidents.

The *Hazardous Chemicals Act* is the provincial environmental legislation dealing with hazardous chemicals and hazardous wastes. The Act is administered by the Wastes and Chemicals and the Pollution Control Divisions of Alberta Environment and includes the provisions for the Director of Pollution Control to issue Chemical Control Orders in the event of an actual or potential risk to the environment.

Of the estimated 14 million tonnes of dangerous goods moving annually in Alberta, about 8 million tonnes move on the roads in roughly 330 000 truckloads. These figures do not include the shipments of sulphur and diesel, nor the so called "less than load" or mixed loads of product.

Incident reports concerning road transport incidents involving dangerous goods in transport, made to Alberta Public Safety Services, have remained relatively constant over the past 2 to 3 years:

ROAD TRANSPORT INCIDENTS REPORTED TO APSS			
1986	**1987**	**1988**	**1989**
(10 months)			(5 months)
137	184	172	83

Of these totals, bulk tanks have been involved in 60% of the incidents with small containers making up the remaining 40% of incidents. The number of incidents reported involving small containers shows some variation, with a peak of 31 incidents in a 4 month period from May through August, 1988. This peak was caused by courier industry reports.

The total number of dangerous goods incidents for all modes, and site incidents, reported to APSS since 1978, shows a marked increase at the time of implementation of the federal *Transportation of Dangerous Goods Act* in July 1985, and the the provincial *Transportation of Dangerous Goods Control Act* in February, 1986.

TOTAL DANGEROUS GOODS INCIDENTS REPORTED TO APSS											
1978	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**
8	12	24	15	13	18	25	96	250	226	254	187*

** Five month period, January 1 - May 31, 1989.*

ANALYSIS OF TRENDS - 1989							
MONTH	**ROAD**	**RAIL**	**SITE**	**DOMESTIC**	**30 DAY**	**NON-DG**	**NON-DG SITE**
January	11	0	3	1	0	0	3
February	14	0	5	3	0	2	0
March	16	0	8	0	2	5	4
April	25	0	19	0	0	8	4
May	17	0	13	0	0	19	5

Alberta has a provincial government infrastructure, probably unique in Canada, on the leading edge in terms of reporting of incidents, technology and the coordinated response to these types of chemical emergencies. Now, extensive investigation, chemical characterization and environmental monitoring, special clean-up crews, and special equipment not only makes the response more effective, but also more visible to the public and the media. Voluntary industry initiatives in the response and public relations fields have also raised the profile of dangerous goods in the communities.

The system involving Alberta Public Safety Services, Alberta Environment, Occupational Health and Safety, Alberta Health and the local Health units, and Alberta Transportation, among others, is becoming more widely known to the public, local authorities and other agencies. The provincial infrastructure is more accessible to municipalities and the public, through 24 hour toll free telephone numbers operated by APSS and Environment. Increased awareness of the new legislation is resulting in the government receiving more incident reports related to dangerous goods incidents. Greater public concern about the environmental impact of the hazardous chemicals spilled in these dangerous goods incidents is resulting in more public enquiries and complaints.

Transportation Issues

Packagings

The federal government has yet to enact the full packaging requirements under the *Transportation of Dangerous Goods Act.*

Regulations

Because of the need for national uniformity, the implementation of the packaging standards in the province is dependent on a very slow amendment process in Transport Canada.

Implementation

The dangerous goods control program is now fully implemented in the province and a total of 767 inspectors have been designated, 747 of whom are drawn from existing law enforcement agencies for highway enforcement. This is the most comprehensive dangerous goods administration and enforcement program in Canada.

Administration and Enforcement

Alberta Public Safety Services has brought 117 cases to trial, 24 of which are still before the courts. A further 7 cases are pending. APSS is working closely with Alberta Transportation and Utilities on the implementation of the *National Safety Code for Motor Carriers*.

Emergency Response Issues.

Site Command and Control

Overall site command and control, including responsibility for limiting or restricting public access, addressing local concerns, and communication with residents is in, and should remain in, the hands of the local authorities. The staffing of many local fire departments with volunteers, has resulted in a dependence on the support of the provincial government in the event of an incident in many areas of the province. Assessment and direction with respect to the spill clean-up, chemical characterization and environmental monitoring is the responsibility of Alberta Environment (Pollution Emergency Response Team).

Highway Closure

The duration and extent of highway closures is of significant concern to the authorities involved and to the public.

Public Safety

The threat (both short and long term) to the health and safety of the public is of growing concern, and the local Medical officer of Health and the Health Units have a role to play.

Cost of Response

As the standards for clean-up of a spill get more stringent, the costs of the emergency response and recovery increases, putting a burden on the local authorities and the industry as a whole. The

provincial government is able to recover costs through provisions of the *Transportation of Dangerous Goods Control Act.*

Training

Both APSS and the Fire Prevention Branch of Alberta Labour have extensive courses to enhance the operations of the local authorities in the area of emergency response planning and operations.

Environmental Issues

Public Perspective

Chemical spills are receiving considerable attention, not only in Alberta, but throughout the world. The public expects a greater degree of environmental clean-up and restoration than ever before, with a great deal of concern for groundwater contamination and potential health impacts due to the exposure to hazardous chemicals.

Administrative Perspective

By using better analytical techniques, Alberta Environment is able to attain a more scientific evaluation of the effectiveness of the environmental response. As we strive for a greater degree of chemical spill recovery, the questions and decisions that arise focus on the final result - "How clean is clean?" The experience gained in the chemical spills clean-ups will enhance future environmental clean-up response and enforcement capability.

Legal Perspective

The formalized spill response requirements need to be streamlined to ensure that effective environmental restoration can be accomplished, without interfering with potential civil action between the companies involved in relation to liability.

Future Trend Perspective

Local authorities will be given an opportunity in the next 6-8 weeks to provide constructive comments and recommendatins for spills clean-up protocols and procedures.

Conclusions.

1. From the analysis of reports to Alberta Public Safety Services, it appears that there has been a moderate increase in the frequency of dangerous occurrence reports related to road transport during the month of April, 1989. It is clear that the industrial compliance with the reporting requirements is improving, resulting from
   a) the publicity surrounding the Highway 831 spill,
   b) the well publicised prosecution of Syncrude and Byers Transport, and
   c) the public response to the spills.

   Other statistical analyses tend to confirm the above:
   1) A large increase in the incidence of non-dangerous goods incident reports.
   2) An increase in the number of site incident reports, primarily from the Edmonton region.
   3) The number of compliance enquiries to APSS Compliance Information Centre has increased by 60%.

   However, over the period studied, the projected frequency of road transport incidents has remained at the 1987 and 1988 level. This could imply that, with the better reporting frequencies to APSS, that the actual incident rate is dropping. We feel the Transportation of Dangerous Goods legislation is positively contributing to a reduction of accidents and at the same time, improving reporting so that the response measures can be taken with dispatch.

2. The ratio of total reported incidents to truckloads of dangerous goods, based on the 1984 estimates, has remained constant at 1 incident per 1200 truckloads. If the frequency of road transport incidents alone is considered, the ratio is 1 incident per 1700 truckloads, based on the first four months of 1989. No comparative data for the rest of Canada is available.

3. The improved functionality and accessibility of the provincial government systems for dealing with dangerous goods and environmental incidents, has increased the profile of these emergencies in the public and the media.

4. Accidents are going to happen, but the prevention of spills in the overall regulatory scheme aims to reduce the probability of a spill and improve mitigation of the consequences in the event of an incident.

5. A regulatory vacuum exists at this time with regard to the packaging standards for dangerous goods in road transport. Amendments to the regulations to address this issue are in the final stages of development by Transport Canada.

6. The onus for emergency response rests with the municipal authorities, with the provincial government providing additional support as necessary.

7. The question of road closure in the event of a spill, is, and will remain, a major issue for the provincial government, the local authorities, and the general public.

8. The provincial government has extensive organizational resources, which contain all the elements necessary to address the emergency response issues of monitoring, assessment, health and environmental clean-up. The 24 hour response capabilities of Alberta Environment's Pollution Emergency Response Team, and the APSS Compliance Information Centre, are examples of units trained and dedicated to emergency response. Under normal circumstances other resources fulfill a number of diverse functions in the government, and can be involved in specific incidents as necessary. The key to effective emergency response to dangerous goods incidents lies in the effective coordination of all these resources.

9. Incident site coordination and control, particularly in the case of an extensive emergency and environmental response, is complex, and at times confused, because of the large number of organizations involved.

10. Industry has taken voluntary initiatives in relation to response to incidents and the awareness and education programs in the communities.

11. The provincial training courses offered by Alberta Labour and Alberta Public Safety Services provide extensive training to the local officials, firefighters and other response personnel. The industry training requirements are covered by the legislative requirements of the *Transportation of Dangerous Goods Act*.

12. Enforcement levels in Alberta are by far the highest in Canada. A combination of proactive education and awareness activities, site visits by inspectors, and a tough enforcement policy has already achieved very good results, which will continue to be monitored to ensure the improvements are continuing.

13. The container types involved in the recent highway spills in Alberta are going to be retested in a review conducted jointly by Transport Canada and APSS.

14. Reporting of dangerous goods or hazardous chemical spills by the carrier or chemical company continues to be a priority so that emergency response measures and incident investigations can be initiated.

Recommendations

1. The provincial government should not overreact to the two highway spills, but rather welcome the attention focused on the issues, which will serve to enhance the reporting frequencies and the compliance on the part of industry, and the profile of the prevention and emergency response programs in Alberta Public Safety Services and Alberta Environment.

2. In order to enhance spill prevention, the provincial government should continue to lobby the federal government to introduce the appropriate packaging and segregation amendments to the *Transportation of Dangerous Goods Regulations* as soon as possible. It is not recommended that Alberta act unilaterally to introduce packaging standards; this would impact Alberta industry and have no application to the large volume of dangerous goods transported interprovincially.

3. To improve the coordinated emergency response support from all involved departments, APSS and Alberta Environment should clarify the coordination aspects of the multitude of activities to support municipal emergency response to dangerous goods incidents.

4. As part of the study, recommended at 3 above, the issue of initial road closures, and the continued closure during clean-up operations should be reviewed by all agencies, including the local authorities.

5. The provincial government should continue to support industry initiatives in the area of hazardous chemical spill response planning, preparedness and the education and awareness programs in the communities.

6. The enforcement program under the *Transportation of Dangerous Goods Control Act* should continue, with continued monitoring to ensure that the improvements accrue.

7. Fine levels under the *Transportation of Dangerous Goods Control Act* are equivalent to the national average, and should remain unchanged at this time.

8. Spill or accidental release reporting regulations should be reviewed to ensure consistency, so as to facilitate enforcement for failure to report under all circumstances.

2. Relevant Statutes and Responsibilities.

2.1. The TRANSPORTATION OF DANGEROUS GOODS CONTROL ACT.

The provincial *Transportation of Dangerous Goods Control Act* regulates the handling, offering for transport and the actual transportation of dangerous goods, including hazardous chemicals and hazardous, or special, wastes, on Alberta's highways.

The Alberta legislation is fully consistent and compatible with federal legislation, the *Transportation of Dangerous Goods Act* and associated Regulations, which regulate similar activities, ie the handling, offering for transport and the transportation, with respect to the air, rail and marine modes of transport as well as the extra-provincial movement by highway.

The Dangerous Goods Control Division of Alberta Public Safety Services has the responsibility for administration of the provincial *Transportation of Dangerous Goods Control Act.* Through agreement with Transport Canada, the Division also administers highway mode requirements for such shipments being transported into, through, and out of the province under the federal Transportation of Dangerous Goods Act. The federal legislation governing air, rail and marine transport in the province is administered by the Dangerous Goods Directorate of Transport Canada.

The Dangerous Goods Control Division coordinates the regulatory and enforcement activities of a number of other government departments and agencies who are participating in the delivery of the dangerous goods program, including the Motor Transport Services Branch of Alberta Transportation and Utilities, the Royal Canadian Mounted Police, and various municipal police forces.

Other aspects of the dangerous goods control program are coordinated with the Fire Prevention Branch of Alberta Labour, Alberta Transportation and Utilities, the Wastes and Chemicals and the Pollution Control Divisions of Alberta Environment, Occupational Health and Safety, Alberta Health, and the local authorities, including the local Boards of Health.

In order to ensure that the transportation of dangerous goods in Canada is uniform across the country, all provinces and territories have adopted the federal legislation and are applying the same criteria to the provincially regulated undertakings in the same manner that Transport Canada regulates federal undertakings.

This minimizes the differences that the company shipping or transporting a dangerous good would experience in interprovincial transportation of these products. In this manner the application of the law is uniform throughout the country, and the transborder flow of products to and from the United States is accommodated under a Canada - U.S. reciprocity agreement.

The legislation prescribes the manner in which dangerous goods are classified and requires that vehicles transporting quantities sufficient to constitute a significant hazard be identified through a safety marking system which immediately identifies those hazards to emergency response personnel. Additional requirements cover explanatory documentation which must accompany the shipment; markings and specifications for packagings and other containers; reporting procedures in the event of an accidental spill, emission or discharge; safety procedures which must be followed; special training which must be undertaken by shippers and carriers as well as a variety of other requirements designed to enhance public safety during the entire transportation process.

Dangerous Goods Inspectors can issue orders under Section 10 of the Act. This process is designed for short term remedial measures in the event of a spill, emission or discharge or dangerous goods.

The legislation defines a "dangerous good" as being any product, substance or organism specified in the Regulations or included by its nature in any of the classes prescribed. Regulated products fall into one or more of the nine internationally recognized classes of dangerous goods. The nine United Nations

classes are:

Class 1	Explosives;
Class 2	Gases: compressed, deeply refrigerated, liquefied or dissolved under pressure;
Class 3	Flammable and combustible liquids;
Class 4	Flammable solids, substances liable to spontaneous combustion, and substances that on contact with water emit flammable gases;
Class 5	Oxidizing substances and organic peroxides;
Class 6	Poisonous and infectious substances;
Class 7	Radioactive materials;
Class 8	Corrosives;
Class 9	Miscellaneous products, substances or organisms considered dangerous to life, health, property or the environment when handled, offered for transport or transported.

In terms of dangerous goods routes, all provincial highways have been so designated, while the *Transportation of Dangerous Goods Control Act* provides for municipalities to implement a routing system which must be approved by the Minister responsible for Alberta Public Safety Services.

2.2. The HAZARDOUS CHEMICALS ACT.

The *Hazardous Chemicals Act* is the primary provincial environmental legislation dealing with hazardous chemicals and hazardous waste and incorporates provisions for issues such as the manifest system, hazardous waste storage and hazardous chemical spills.

The legislation defines "hazardous chemicals" as being any substance, class of substance or mixture of substances that is entering or is capable of entering the environment in a quantity or concentration or under conditions that may constitute a danger to:

(i) the environment,

(ii) plant or animal life, or

(iii) human health;

The term "hazardous waste" is defined in the legislation as meaning a hazardous chemical disposed of or to be disposed of as a waste. The Environmental Protection Service of Alberta Environment has the responsibility for the administration of the *Hazardous Chemicals Act* and the *Hazardous Waste Regulations*. The hazardous waste manifest system is administered by the Waste and Chemicals Division; licensing of hazardous waste storage facilities and approving landfill disposal is the responsibility of the Standards and Approvals Division and the Pollution Control Division has the mandate for resolving environmental response issues, investigation and enforcement.

Under Section 4(4) of the *Hazardous Chemicals Act* the Minister of the Environment may issue an order directing a person responsible for a hazardous chemical

(a) to furnish all specified information,

(b) prohibiting or restricting the sale or distribution of crops, food, etc, which may have been exposed to a hazardous chemical, or

(c) to cause the crop, food, etc, or other matter exposed to the hazardous chemical to be destroyed or decontaminated or otherwise rendered harmless.

The provision for the Director of Pollution Control to issue Chemical Control Orders is outlined in Section 6 of the *Hazardous Chemicals Act*. The enabling provisions are based on actual or potential risk to the environment, property, plant or animal life or the safety or persons; and allow general direction relating to the manner in which the hazardous chemical may be handled, stored, used, disposed of, transported, displayed or manufactured.

Section 7.1 of the *Hazardous Chemicals Act* has specific provisions for emergency measures in case of

a spill; its applicability is limited to "a facility for the storage, treatment or disposal of hazardous chemicals".

2.3. Legislative Chronology.

2.3.1. Transportation of Dangerous Goods Control Act.

July 17, 1980	Federal *Transportation of Dangerous Goods Act*, Chapter 36, Revised Statutes of Canada, passed by parliament.
May 4, 1982	Provincial *Transportation of Dangerous Goods Control Act*, Chapter T-6.5, Revised Statutes of Alberta, passed by the legislature.
July 1, 1985	Federal Regulations came into force.
Feb 1, 1986	Provincial Regulations came into force adopting the substantive provisions of the Federal Regulations.
Feb 1, 1986 - Jan 31, 1987	Administration of the *Transportation of Dangerous Goods Control Act*, focussed on voluntary compliance. Warning notices (245) issued for flagrant violations.
Feb 1, 1987 - Jan 31, 1988	Selective prosecution introduced with charges being laid whenever an accident which involved dangerous goods occurred and noncompliance was found to have been a contributing factor or could have potentially endangered life, property or the environment as well as in those cases where the violator had been previously issued a warning notice or had been the subject of a follow-up investigation.
Feb 1, 1988 - Jan 31, 1989	Prosecution of flagrant or repetitive violations, in addition to the previous criteria.
Feb 1, 1989 - present	Full enforcement and prosecution.

2.3.2. Hazardous Chemicals Act.

1980	*Hazardous Chemicals Act* proclaimed.
December 1987	*Hazardous Waste Regulation* filed.
April 1, 1988	*Hazardous Waste Regulation* comes into force.
April 1, 1989	365 day provision for the storage of hazardous waste without a licence in effect.

3. Scope of the Problem.

3.1. Volumes of Dangerous Goods Transported in Alberta.

Prior to the implementation of the Dangerous Goods program in the province, Alberta Economic Development and Trade, assisted by Alberta Public Safety Services and Alberta Transportation and Utilities, commissioned a study, undertaken by Stanley Associates Engineering Limited, to determine the volumes, and traffic flow patterns for dangerous goods in Alberta. This report was published in 1984, and represents a base case "snapshot" of the provincial situation. It should be noted that the Stanley study could not ascertain the volume of dangerous goods transported in the so called "Less than Load"

or mixed load shipments. For this reason, the volumes of Class 7, Radioactive materials, are zero, as this class is primarily transported in small quantities.

Additionally, the study does not include the volumes of diesel and molten sulphur transported in the province, since, at that time, Transport Canada did not intend to regulate these products. A recent amendment to the federal regulations will regulate these products as of August 1, 1989, and thus the volumes of regulated dangerous goods transported in the province will increase dramatically.

This report indicates a total quantity of dangerous goods moving in Alberta of approximately 13 million tonnes. We estimate that this total is probably about 14 million tonnes today (excluding diesel and molten sulphur shipments). The Table below shows a more detailed breakdown; however of particular importance are the volumes transported by road of 7.2 million tonnes (now probably closer to 8 million tonnes) or 300 000 truckloads (now 330 000) annually. Due to the age of the report, APSS is undertaking an update of the study, in conjunction with Alberta Transportation, and results are expected before year end.

TRANSPORTATION OF DANGEROUS GOODS IN ALBERTA
ROAD TRANSPORT

(ref. Transportation of Dangerous Goods In Alberta, SAEL, 1984)

DANGEROUS GOODS CLASSIFICATION	TRUCKLOADS	TOTAL %	TONNES	%
1 Explosives	3611	1.2	24804	0.3
2 Compressed Gases	61145	20.7	1 142 210	15.9
3 Flammable Liquids	211 712	71.6	5 583 612	77.6
4 Flammable Solids	994	0.3	34 350	0.5
5 Oxidizers, Organic Peroxides	9 795	3.3	206 948	2.9
6 Poisonous or Infectious	1 164	0.4	19 799	0.3
7 Radioactives	0	0	0	0
8 Corrosives	6 143	2.1	164 772	2.3
9 Miscellaneous	1 019	0.3	21 647	0.3
TOTAL	295 583	100.0	7 198 142	100.0

TRANSPORTATION OF DANGEROUS GOODS IN ALBERTA
RAIL TRANSPORT

(ref. Transportation of Dangerous Goods In Alberta, SAEL, 1984)

DANGEROUS GOODS CLASSIFICATION	CARLOADS	TOTAL %	TONNES	%
1 Explosives	390	0.5	229 308	4.0
2 Compressed Gases	37 347	42.8	2 464 810	43.0
3 Flammable Liquids	25 343	29	1 896 660	33.1
4 Flammable Solids	110	0.1	3 158	0.0
5 Oxidizers, Organic Peroxides	4 018	4.6	335 162	5.8
6 Poisonous or Infectious	791	0.9	23 869	0.4
7 Radioactives	0	0	0	0
8 Corrosives	9 434	10.8	766 577	13.4
9 Miscellaneous	0	0	0	0
Mixed Loads	9 876	11.3	229 308	4.0
TOTAL	87 309	100.0	5 734 245	100.0

3.2. Incident Statistics.

The following incident statistics are drawn from Alberta Public Safety Services database and reflect the number of road incidents reported from February 1986, when the provincial Dangerous Goods Legislation came into force, to the present time, broken down into 4 month periods over each year. Under the *Transportation of Dangerous Goods Control Regulations*, an immediate report to the local police is required, for example in the event of a spill, emission or discharge of a dangerous good in excess of a regulated volume or mass.

APSS receives a number of incident reports, including site, air and rail incidents. The data shown reflects the incidents involving **road transport,** and has been broken down to reflect the container type involved. A BULK tank is defined as any container having a water capacity greater than 100 gallons (454 liters). The small containers may be cylinders, drums, boxes, aerosols, or bags, depending on the product involved.

NUMBER OF ROAD TRANSPORTATION INCIDENTS INVOLVING DANGEROUS GOODS IN ALBERTA

(ref. Dangerous Goods Information System, Alberta Public Safety Services)

DANGEROUS OCCURRENCE TYPE	YEAR - 1986 (part year) MONTH				
	2-4	5-8	9-12	TOTAL	%
CHEMICAL SPILLS - Bulk Tanks	16	25	31	72	*52.6*
CHEMICAL SPILLS - Small Containers	6	7	10	23	*16.8*
INCIDENTS- No spill - Bulk	6	4	6	16	*11.6*
INCIDENTS- No spill - Small Containers	6	7	13	26	*19.0*
TOTAL	34	43	60	137	*100.0*
	YEAR - 1987 MONTH				
	1-4	5-8	9-12	TOTAL	%
CHEMICAL SPILLS - Bulk Tanks	35	34	32	101	*54.9*
CHEMICAL SPILLS - Small Containers	26	20	16	62	*33.7*
INCIDENTS- No spill - Bulk	3	3	4	10	*5.4*
INCIDENTS- No spill - Small Containers	1	7	3	11	*6.0*
TOTAL	65	64	55	184	*100.0*
	YEAR - 1988 MONTH				
	1-4	5-8	9-12	TOTAL	%
CHEMICAL SPILLS - Bulk Tanks	32	31	22	85	*49.4*
CHEMICAL SPILLS - Small Containers	18	31	15	64	*37.2*
INCIDENTS- No spill - Bulk	4	3	1	8	*4.7*
INCIDENTS- No spill - Small Containers	8	5	2	15	*8.7*
TOTAL	62	70	41	172	*100.0*
	YEAR - 1989 MONTH				
	1-4	5-8	9-12	TOTAL	%
CHEMICAL SPILLS - Bulk Tanks	36	8		44	*53.0*
CHEMICAL SPILLS - Small Containers	17	4		21	*25.4*
INCIDENTS- No spill - Bulk	6	3		9	*10.8*
INCIDENTS- No spill - Small Containers	7	2		9	*10.8*
TOTAL	66	17		83	*100.0*

3.3. Trends

1. Incidents reported to APSS in relation to road transport have remained relatively constant in the years 1987-1989. The lower number of reports in 1986 can be attributed to the fact that the *Transportation of Dangerous Goods Control Act* came into effect in February, 1986. The gradual increase in the number of reports during 1986 can be attributed to the education and awareness activities of the Dangerous Goods Control Division at that time. The fact that the education, awareness and enforcement activities has increased the awareness of the reporting requirements, with the level of reports over the period 1986 - 1988 remaining at a relative level, tends to suggest that there are fewer unreported incidents, thus the overall incident frequency is reducing.

2. In 1987, the number of small container spills reported increased, although the number of incidents involving bulk units remained at a constant level. This can be attributed to the fact that APSS shifted its education and awareness activities from the larger bulk transporters to the small shipment consignors.

ANALYSIS OF TRENDS - 1989							
MONTH	ROAD	RAIL	SITE	DOMESTIC	30 DAY	NON-DG	NON-DG SITE
January	11	0	3	1	0	0	3
February	14	0	5	3	0	2	0
March	16	0	8	0	2	5	4
April	25	0	19	0	0	8	4
May	17	0	13	0	0	19	5

3. From the analysis of reports to Alberta Public Safety Services, it appears that there has been a moderate increase in the frequency of dangerous occurrence reports related to road transport during the month of April, 1989. It is clear that the industrial compliance with the reporting requirements is improving, resulting from:
   a) the publicity surrounding the Highway 831 spill,
   b) the well publicised prosecution of Syncrude and Byers Transport, and
   c) the public response to the spills.

   Other statistical analyses tend to confirm the above:
   1) A large increase in the incidence of non-dangerous goods incident reports.
   2) An increase in the number of site incident reports, primarily from the Edmonton region.
   3) The number of compliance enquiries to APSS Compliance Information Centre has increased by 60%.

   However, over the period studied, the projected frequency of road transport incidents has remained at the 1987 and 1988 level. This could imply that, with the better reporting frequencies to APSS, that the actual incident rate is dropping. We feel the Transportation of Dangerous Goods legislation is positively contributing to a reduction of accidents and at the same time, improving reporting so that the response measures can be taken with dispatch.

4. Small container spills peaked in May - August, 1988, after which time the reports have returned to previous levels. During this time, APSS had focused on the problem and targeted the courier industry as a problem area. Intensive inspection and awareness visits were conducted. The results were that couriers:
   a) reviewed their operating procedures, resulting in more reports of spills,
   b) began refusing to accept poorly packed or non-compliant shipments, and
   c) introduced improved handling procedures for small containers of dangerous goods.

4. Rationale for Trends.

4.1. General.

Since the early 1980's the transportation of dangerous goods has taken on a higher profile with the public. Incidents in Canada and elsewhere in the world, have focussed attention on the real risks associated with these products, and perhaps the turning point in Canada was the incident at Kenora involving a spill of PCB's. In the post-Kenora phase, the whole issue of the transport of dangerous goods, the effect of chemical spills on the environment and the public safety aspects became a high profile issue for all Canadians.

On the other hand, the major environmental disasters or spills in recent times, such as Bhopal, Exxon's oil spill, and the St. Basile le Grande PCB fire , etc. have heightened the public concern with respect to environmental issues, such as clean-up, and reclamation of the spill site, and long term health and environmental issues, in other words the "chronic effects" of the incident.

The onus is on the municipalities to respond to a dangerous goods incident under the *Alberta Public Safety Services Act* and the *Municipal Government Act*. Most municipalities need assistance from the provincial government to adequately deal with serious spills.

Alberta has a provincial government infrastructure in place to deal with these issues. The system is probably unique in Canada, on the leading edge in terms of reporting of incidents, technology and the coordinated response to these types of emergencies.

The coordinated provincial government system involving Alberta Public Safety Services, Alberta Environment, Occupational Health and Safety, Alberta Health and the local Health units, and Alberta Transportation, among others, is becoming more widely known to the public, local authorities and other agencies. The response capabilities of the provincial authorities have been honed by coping with incidents such as the Lodgepole sour gas release in 1982 and the 1987 tornado response in Edmonton.

The introduction of the *Transportation of Dangerous Goods Control Regulation* in 1986 and the reorganization and refocusing of the Pollution Emergency Response Team of Alberta Environment, have increased the functionality of the system. This has resulted from better information being available at the scene (from the required safety marks and documentation) to better coordination of information resources of the involved departments.

Industry response to the spills issue has taken the form of special response teams and awareness packages. The Canadian Chemical Producer's Association (CCPA) Transportation Emergency Assistance Plan (TEAP) team, the chlorine industry's CHLOREP response teams are examples of the response activities. In the education and awareness area, the CCPA has introduced the CAER (Community Awareness - Emergency Response) and the TRANSCAER (Transportation Community Awareness - Emergency Response) programs, which have raised the profile of dangerous goods in the communities.

Several years ago, there was virtually no special clean-up response program in place in the province. Now, extensive investigation, site monitoring, special clean-up crews, and special equipment not only makes the response more effective, but also more visible to the public and the media. Through more effective response, we are raising public awareness of these issues. Initial investigations are now providing a more scientific basis for impact evaluation and environmental clean-up response planning.

The provincial infrastructure is more accessible to municipalities and the public, through the toll free telephone numbers operated on a 24 hour basis by APSS and Environment and because of the increased awareness on the part of industry and the public, functionality and legislated requirements, the government is receiving more incident reports related to dangerous goods incidents *in toto*.

TOTAL DANGEROUS GOODS INCIDENTS REPORTED TO APSS											
1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
8	12	24	15	13	18	25	96	250	226	254	187*

** Five month period, January 1 - May 31, 1989.*

4.2. Transport Related Issues.

Packaging

The *Transportation of Dangerous Goods Regulations* have been introduced in phases. The outstanding areas of regulation are the packaging and segregation requirements for road transport. Transport Canada has published the first part of the requirements, the standards for construction of packagings and containers transporting dangerous goods, in Canada Gazette, Part I, for comment (August, 1987), while the second aspect, the regulations regarding the selection and use of the standard packagings, are expected to be published for comment in the fall of 1989.

It must be noted that the full packaging requirements for air, rail and marine transport are in place, and as many shipments move intermodally, a large number of road shipments will already be in compliance with a packaging standard.

If Alberta were to act unilaterally and introduce packaging standards under the *Transportation of Dangerous Goods Control Act*, the impact on the intraprovincial shippers and carriers would be substantial, while these standards would have no application to interprovincial shipments of dangerous goods, a large portion of the total volume of dangerous goods transported in the province.

Regulations.

The province is committed to the principle of national uniformity by the process of adoption of the federal regulations, and thus ensures that the industry in the province is not disadvantaged through the imposition of a different regime for intraprovincial shipment of dangerous goods. This does result in the fact that the administration of the regulations is dependent on a very slow amendment process in place in Transport Canada and the Department of Justice. Serious situations can be dealt with using a provincial Stop Order under the *Transportation of Dangerous Goods Control Act;* however, the use of the Stop Order is considered to be an ultimate penalty, due to the impact on the industry involved.

Implementation.

The Dangerous Goods program in the province is now fully implemented, save for the final step of the introduction of the voluntary penalty process, expected in this calendar year. A total of 767 inspectors have been designated under the Act, 747 for the purposes of on-highway inspection, and 20 full time employees of APSS, 7 of whom complete facility inspections and investigations from the APSS District Offices. This represents the most comprehensive administrative and enforcement program for the regulation of dangerous goods transportation in the country. The inspectors have completed an intensive education and awareness program and now undertake a total of approximately 2 000 site visits and investigations annually. The full enforcement program is aimed not only at the transporters, but focuses on the origin of the shipments, the shippers, where corrective action or prosecution can have the maximum benefit during the highway transport phase.

Administration and Enforcement.

In terms of prosecution, during the "phased-in" program, a total of 750 warning notices have been issued. Alberta Public Safety Services inspectors have brought 117 cases to trial, 24 of which are still before the courts. A further 7 cases are pending. Charges have been laid by APSS in relation

to the spill on Highway 831, and the investigation is continuing into the Highway 16X spill.

Alberta Public Safety Services is working closely with the Motor Transport Services Branch of Alberta Transportation on the implementation of the *National Safety Code for Motor Carriers* providing the branch with details of carrier infractions under the dangerous goods legislation. To date, this recently introduced program has resulted in at least one company having its operating authority withdrawn by the Motor Transport Services, in part because of poor compliance with the dangerous goods regulatory requirements.

The fine levels levied by the courts in the cases heard in the province are in line with the national average. however the real cost to industry in the event of a spill is the cost of the clean-up, and compensation. These will be determined in civil proceedings against the companies at fault, rather than in criminal proceedings instituted by the province. Together, the costs should form an adequate deterrent.

4.3. Emergency Response Issues.

The response to a dangerous goods incident is increasing in complexity and involves more departments and agencies as the number and types of chemicals transported grows. The overriding principle of the response is safety - of the responders, the general public and the environment. The onus for emergency response rests with the municipal authorities, with the provincial government providing additional support as necessary.

As the Agency responsible for emergency response planning and preparedness, APSS has been a lead provincial agency in developing the coordinated response on the part of the provincial government. Alberta Environment is responsible for assessing the effectiveness of the clean-up process, environmental monitoring, evaluating potential environmental impact and specifying acceptable site clean-up standards in the case of chemical spills. As public awareness and concern increases, the issues in relation to response include

Site Command and Control

In many areas of the province, local fire departments are staffed by volunteers, who may not have the training and experience of the large urban fire service personnel. In the situation where an incident occurs in a region covered by a volunteer department, there is heavy reliance on the provincial government resources and expertise. However, overall site command and control, including responsibility for limiting or restricting public access, addressing local concerns, and communication with residents is in, and should remain in, the hands of the local authorities. Assessment and direction with respect to the spill clean-up, chemical characterization and environmental monitoring is the responsibility of Alberta Environment (Pollution Emergency Response Team).

Highway Closure

The duration and extent of highway closure is a concern to the public and the governments involved; local authorities for roads under their jurisdiction and Alberta Transportation and Utilities for provincial highways.

Public Safety

Major events may result in evacuation of local residents and dislocation of the affected people for a period of time. Health issues, in both the short and long term, are the concern of Alberta Health, the local Boards of Health and the Disaster Services Division of Alberta Public Safety Services.

Cost of Response

Many local authorities do not have the fiscal resources to staff and maintain an extensive emergency response force. The cost of specialized response is borne by the companies in most cases,

although the trend is for industry to constantly monitor the response to minimize their exposure in this area. Specialized industry response teams have been formed to deal with specific situations, but the overall result is that the provincial government may be required to bear the cost, and recover the expenses through civil action. This procedure is provided for under the *Transportation of Dangerous Goods Control Act.*

APSS is looking into the problems associated with the businesses affected by the recent spill on Highway 831.

Training

The Training Division of APSS, and the Fire Prevention Branch of Alberta Labour have been addressing the issue of site command procedures and training in courses for municipal officials and fire officers at their training facilities. Additionally, APSS training staff undertake the Dangerous Goods Instructor's Orientation and the Dangerous Goods Awareness courses in communities throughout Alberta.

Alberta Public Safety Services is responsible for the formulation and implementation of the provincial government Peacetime Emergency Operations Plan. As a result of concerns raised at the local and provincial level in the light of recent events, APSS is considering laying out the coordination protocols drawn from the established plans and agreements.

4.4. Environmental Issues.

In light of the recent spill incidents, especially the two highway spills: Highway 831 Lamont - Boyle and Highway 16X, Edmonton, the environmental issues can be focussed from the public, administrative, legal and perceived future trend perspective.

The Public Perspective

Hazardous chemical spills not only in Alberta but throughout the world are receiving considerable media attention. The sampling and analytical capabilities have improved significantly in the last few years, and therefore, generally, we have a better indication of what chemical we are dealing with and what the environmental concentrations are. Inevitably, however, the information available on the toxicity, especially in the longer term, is not clearly defined and often a scientist can be found by the media that is willing to express public concern for some "potential" long term health impact of chemicals.

Out-of-sight is no longer out-of-mind. People are no longer accepting flushing a chemical down the ditch or sewer as a clean-up response. The public has a much greater concern for groundwater contamination and the potential for future health impacts.

Administrative Perspective

Better and quicker analytical techniques are providing a more scientific evaluation of the effectiveness of the clean-up. A difficult decision can then be "What is clean?", or to what level must the spill be cleaned-up? Depending on the specific chemical, the available information can vary widely and some controversy may develop as to whether a specific clean-up requirement was reasonable. An illustration of this aspect was the question of whether the road surface at highway 16X should be coated with the asphaltic mix or not. The recommendation by Alberta Environment to the City of Edmonton was to coat the road; the chemical company did not feel that it was necessary.

Legal Perspective

The cost of chemical spill clean-ups are generally high. For example the highway 831 clean-up costs exceeded $500,000 and therefore liability is a concern both to the transporting company as well as the manufacturing or packaging company.

The formalization of clean-up requirements need to be reviewed to ensure that the main concern of environmental clean-up can be addressed without interfering with potential civil litigation between the chemical companies and the transportation companies as to specific cost liabilities.

While the cost of clean-up will in most cases far exceed the amount that could be extracted in fines, the public desire for punitive measures for proven negligence should be reviewed. Enforcement action may have significant impact on civil litigation to establish liability for clean-up costs.

Future Trend Perspective

Public concerns with regard to hazardous chemical spills and consequent perceived health risk, is likely to remain high or increase. For the short term especially, the occurrence of spills heightens the public awareness, and is likely to increase public reporting of any observed spills.

The response capability, and the effectiveness of provincial agencies with regard to the two recent highway chemical spills, will be evaluated in incident de-briefing sessions involving local authorities. These de-briefing sessions will occur within the next 6-8 weeks and will no doubt provide constructive suggestions for improvement.

Chemical manufacturing companies and trucking companies have a heightened awareness of potential liabilities with regard to clean-up costs. The Canadian Chemical Producer's Association and the Alberta Trucking Associations may be excellent forums for the discussion of ways in which hazardous chemical spills can be prevented or minimized, as well as how the clean-up response can be improved.

5. Conclusions and Recommendations.

5.1. Conclusions

1. From the analysis of reports to Alberta Public Safety Services, it appears that there has been a moderate increase in the frequency of dangerous occurrence reports related to road transport during the month of April, 1989. It is clear that the industrial compliance with the reporting requirements is improving, resulting from
   a) the publicity surrounding the Highway 831 spill,
   b) the well publicised prosecution of Syncrude and Byers Transport, and
   c) the public response to the spills.

   Other statistical analyses tend to confirm the above:
   1) A large increase in the incidence of non-dangerous goods incident reports.
   2) An increase in the number of site incident reports, primarily from the Edmonton region.
   3) The number of compliance enquiries to APSS Compliance Information Centre has increased by 60%.

   However, over the period studied, the projected frequency of road transport incidents has remained at the 1987 and 1988 level. This could imply that, with the better reporting frequencies to APSS, that the actual incident rate is dropping. We feel the Transportation of Dangerous Goods legislation is positively contributing to a reduction of accidents and at the same time, improving reporting so that the response measures can be taken with dispatch.

2. The ratio of total reported incidents to truckloads of dangerous goods, based on the 1984 estimates, has remained constant at 1 incident per 1200 truckloads. If the frequency of road transport incidents alone is considered, the ratio is 1 incident per 1700 truckloads, based on the first four months of 1989. No comparative data for the rest of Canada is available.

3. The improved functionality and accessibility of the provincial government systems for dealing with dangerous goods and environmental incidents, has increased the profile of these emergencies in the public and the media.

4. Accidents are going to happen, but the prevention of spills in the overall regulatory scheme aims to reduce the probability of a spill and improve mitigation of the consequences in the event of an incident.

5. A regulatory vacuum exists at this time with regard to the packaging standards for dangerous goods in road transport. Amendments to the regulations to address this issue are in the final stages of development by Transport Canada.

6. The onus for emergency response rests with the municipal authorities, with the provincial government providing additional support as necessary.

7. The question of road closure in the event of a spill, is, and will remain, a major issue for the provincial government, the local authorities, and the general public.

8. The provincial government has extensive organizational resources, which contain all the elements necessary to address the emergency response issues of monitoring, assessment, health and environmental clean-up. The 24 hour response capabilities of Alberta Environment's Pollution Emergency Response Team, and the APSS Compliance Information Centre, are examples of units trained and dedicated to emergency response. Under normal circumstances other resources fulfill a number of diverse functions in the government, and can be involved in specific incidents as necessary. The key to effective emergency response to dangerous goods incidents lies in the effective coordination of all these resources.

9. Incident site coordination and control, particularly in the case of an extensive emergency and environmental response, is complex, and at times confused, because of the large number of organizations involved.

10. Industry has taken voluntary initiatives in relation to response to incidents and the awareness and education programs in the communities.

11. The provincial training courses offered by Alberta Labour and Alberta Public Safety Services provide extensive training to the local officials, firefighters and other response personnel. The industry training requirements are covered by the legislative requirements of the *Transportation of Dangerous Goods Act*.

12. Enforcement levels in Alberta are by far the highest in Canada. A combination of proactive education and awareness activities, site visits by inspectors, and a tough enforcement policy has already achieved very good results, which will continue to be monitored to ensure the improvements are continuing.

13. The container types involved in the recent highway spills in Alberta are going to be retested in a review conducted jointly by Transport Canada and APSS.

14. Reporting of dangerous goods or hazardous chemical spills by the carrier or chemical company continues to be a priority so that emergency response measures and incident investigations can be initiated.

5.2. Recommendations

1. The provincial government should not overreact to the two highway spills, but rather welcome the attention focused on the issues, which will serve to enhance the reporting frequencies and the compliance on the part of industry, and the profile of the prevention and emergency response programs in Alberta Public Safety Services and Alberta Environment.

2. In order to enhance spill prevention, the provincial government should continue to lobby the federal government to introduce the appropriate packaging and segregation amendments to the *Transportation of Dangerous Goods Regulations* as soon as possible. It is not recommended that Alberta act unilaterally to introduce packaging standards; this would impact Alberta industry and have no application to the large volume of dangerous goods transported interprovincially.

3. To improve the coordinated emergency response support from all involved departments, APSS and Alberta Environment should clarify the coordination aspects of the multitude of activities to support municipal emergency response to dangerous goods incidents.

4. As part of the study, recommended at 3 above, the issue of initial road closures, and the continued closure during clean-up operations should be reviewed by all agencies, including the local authorities.

5. The provincial government should continue to vigorously support industry initiatives in the area of transportation safety, hazardous chemical spill response planning, preparedness and the education and awareness programs in the communities.

6. The enforcement program under the *Transportation of Dangerous Goods Control Act* should continue at current levels, with active monitoring to ensure that the improvements accrue.

7. Fine levels under the *Transportation of Dangerous Goods Control Act* are equivalent to the national average, and should remain unchanged at this time.

8. Spill or accidental release reporting regulations should be reviewed to ensure consistency, so as to facilitate enforcement for failure to report under all circumstances.